

REMARKS

This Amendment is submitted in reply to the Final Office Action dated April 16, 2007. The Applicants respectfully request reconsideration and further examination of the patent application under 37 C.F.R. § 1.113.

Summary of the Examiner's Rejections

Claim 4 was objected to because of the following informality: Claim 4 depends from Claim 3, which is canceled.

Claims 1-2, 4, 6, 9, 13-14, 16, 20-23, 25, 31-32 and 34 were rejected under 35 U.S.C. 102(b) as being anticipated by Glazer (US 6,824,866).

Claims 1-2, 4, 13, 22, 25, 31 and 38 were rejected under 35 U.S.C. 102(e) as being anticipated by Havens (US 6,306,348).

Claims 14 and 32 were rejected under 35 U.S.C. 103(a) as being unpatentable over Glazer (US 6,824,866) in view of Kuroita (US 5,990,302).

Claims 14 and 32 were rejected under 35 U.S.C. 103(a) as being unpatentable over Havens (US 6,306,348) in view of Kuroita (US 5,990,302).

Summary of Amendment

Applicants have canceled Claims 22-23, 25, 31-32 and 34 (without prejudice), amended Claims 1, 2, 4 and 38, and added Claim 39 to more particularly define the present invention.

Oath/Declaration

The Applicants submit herewith a new executed Declaration for the present application.

Remarks Regarding Objection of Claim 4

Claim 4 was objected to because of the following informality: Claim 4 depended from Claim 3, which has been canceled. Applicants have amended Claim 4 to depend from Claim 1. As such, Applicants respectfully request removal of this objection.

Remarks Regarding § 102 and 103 Rejections

Applicants respectfully submit that amended independent Claim 1 is patentable over Glazer, Havens, Kuroita, or any combination thereof. The amended independent Claim 1 recites the following:

1. A substrate for attaching an array of biological or chemical analytes, said substrate comprises:
 - a) a porous inorganic layer, derived from individual particles;
 - b) said porous inorganic layer having a plurality of interconnected voids of a predetermined mean size dispersed therethrough, and having void channels that extend through to an exposed surface of said porous inorganic layer;
 - c) a glass interlayer which has a softening point that is lower than a softening point of the individual particles used to derive said porous inorganic layer; and
 - d) a flat, rigid, non-porous, inorganic understructure, wherein said glass interlayer is disposed between said porous inorganic layer and said flat, rigid, non-porous, inorganic understructure (emphasis on main distinguishing limitations).

The teachings of Glazer, Havens, and Kuroita differ significantly from the substrate recited in amended independent Claim 1. The independent Claim 1 was amended such that the claimed substrate now recites a glass interlayer disposed between the porous inorganic layer and the flat, rigid, non-porous, inorganic understructure (note: the glass interlayer has also been recited to have a softening point that is lower than a softening point of the individual particles which are used to derive the porous inorganic layer). Havens does not teach the claimed substrate which has a glass interlayer disposed between a porous inorganic layer and a non-porous, inorganic understructure. Instead, Havens discloses where an addressable micron-location is formed on a metal site 12 and incorporates an oxidation layer 20, a permeation layer 22, an attachment layer 24, and a binding entity layer 26 (note: the oxidation layer 20 is a metal oxide that provides a base for the coupling of the permeation layer 22) (see col. 5, lines 45-55 and FIG 2). This is different than the claimed substrate which has a glass interlayer disposed between the porous inorganic layer and the flat, rigid, non-porous, inorganic understructure. In addition, Havens does not teach or suggest the claimed glass interlayer which has a softening point that is lower than a softening point of the individual particles which are used to derive the porous inorganic layer. Kuroita does not cure this defect.

Applicants respectfully submit that Glazer also does not teach the claimed substrate which has a glass interlayer disposed between a porous inorganic layer and a non-porous, inorganic understructure. To support this contention, see the previous Office Action dated September 9, 2006 where the Examiner indicated on page 10 that "Glazer (WO 00/61282) was silent regarding an intermediate layer between a porous layer and a non-porous understructure" (note: Glazer WO 00/61282 appears to have the same specification/drawings as Glazer US 6,824,866). In addition, Glazer does not teach or suggest the claimed glass interlayer which has a softening point that is lower than a softening point of the individual particles which are used to derive the porous inorganic layer. Kuroita does not cure this defect. In view of at least the foregoing remarks, Applicants respectfully submit that amended independent Claim 1 and the associated dependent Claims 2, 4, 9, 13-14, 16 and 20-21 are patentable over Glazer, Havens, and Kuroita, individually or in any combination suggested in the Examiner's rejections.

Moreover, in the Office Action dated September 9, 2006, the Examiner rejected then pending dependent Claim 8 (now canceled) which recited an "interlayer" as being obvious in view of Glazer WO 00/61282 and Nagasawa (US 6,897,021). Currently, the amended independent Claim 1 recites a "glass interlayer" and not an "interlayer" and the Applicant respectfully submits that Glazer WO 00/61282 or Nagasawa or any combination thereof does not teach or suggest the claimed substrate that has the "glass interlayer" disposed between a porous inorganic layer and a non-porous, inorganic understructure. As stated above, the Examiner had indicated that Glazer WO 00/61282 was silent regarding an intermediate layer between a porous layer and a non-porous understructure". Applicants respectfully submit that Nagasawa does not teach or suggest the claimed "glass interlayer". Instead, Nagasawa teaches an "adhesive 2" that binds reactive probe-loaded tiles 3 onto a glass slide 1 (see col. 3, lines 48-55, example 6 which used an "acrylic adhesive" and FIG. 5). This is different than the claimed substrate which has a "glass interlayer" disposed between a porous inorganic layer and a non-porous, inorganic understructure.

Furthermore, Applicants respectfully submit that the priority date of amended independent Claim 1 is now August 31, 2000 because the "glass interlayer" appears to be first introduced in the co-pending U.S. Patent Application No. 09/650,885 (see pages 23 and 24 in filed patent application). However, the previously cited Nagasawa has filing date of March 30, 2001 and claims priority to three JP applications dated March 30, 2000 and September 27, 2000. Applicants respectfully request that if the Examiner rejects the amended independent Claim 1 based on Nagasawa then this "adhesive" disclosure date should be confirmed to make sure Nagasawa is indeed prior art. In view of at least the foregoing remarks, Applicants respectfully submit that amended independent Claim 1 and the associated dependent Claims 2, 4, 9, 13-14, 16 and 20-21 are patentable over Glazer WO 00/61282 and Nagasawa (both of which have been cited in the previous Office Action).

Referring now to amended independent Claim 38, Applicants respectfully submit that this claim is patentable over Glazer, Havens, Kuroita, or any combination thereof. The amended independent Claim 38 recites the following:

38. A substrate for attaching an array of biological or chemical analytes, said substrate comprises:
- a) a flat, rigid, non-porous, inorganic understructure;
 - b) a tape-casted porous inorganic layer, derived from individual particles, adhered to said flat, rigid, non-porous, inorganic understructure; and
 - c) said tape-casted porous inorganic layer having a plurality of interconnected voids of a predetermined mean size dispersed therethrough, and having void channels that extend through to an exposed surface of said tape-casted porous inorganic layer (emphasis on main distinguishing limitations).

Applicants have amended independent Claim 38 to now recite a "tape-casted porous inorganic layer" instead of "a porous inorganic layer, derived from one or more tape-casted frit layers of individual particles". Plus, the term "frit" is no longer recited in the amended independent Claim 38. Applicants respectfully submit that the amended independent Claim 38 with the term "tape-casted porous inorganic layer" is not a product-by-process claim since a "tape-casted porous inorganic layer" is structurally different from, for example, a "sol-gel porous inorganic layer", "spray-coated porous inorganic", "spin-coated porous inorganic layer" or "dip-coated porous inorganic layer". In particular, the present application discusses several structural differences associated with the "tape-casted porous inorganic layer" and several advantages associated with using a tape-casting method to make the "tape-casted porous inorganic layer", for example:

"In a tape-cast porous layer, the size and amount of porosity can be controlled by the solid-loading of the slip, firing temperature and time, and size of the ceramic or glass particles in the slip. Typical values of porosity can range between fully dense at 0 to about 99 percent, preferably about 70 to 95 percent, and size of the pores can be varied between 0.1 to 20 μm . Thickness of the porous inorganic layer is controlled by the gap height of the tape casting blade. The tape casting is an attractive process for manufacture of porous DNA binding layers for several reasons. First, a large scale, continuous, manufacturing process is easily implemented. Second, tape cast porous layers have a uniform thickness and the process as a whole is reproducible. Third, the cost of chemicals used in the manufacture of the slip is low. Fourth, tape casting is capable of producing layers with thickness in the range of about 5 μm to about 100 μm in a single step. Other techniques such as sol-gel (e.g., U.S. Patent No. 5,585,136, incorporated herein by reference), spray-coating, spin-coating, or dip-coating also can be used to produce porous inorganic layers, but these techniques tend to be inferior to tape casting. For example, multiple coating steps with intermediate drying may be necessary for sol-gel and dip coating techniques to produce a layer of sufficient thickness. This type of processing complicates manufacture since the process cannot be executed in continuous manner. Most importantly, uniformity and reproducibility of layers from batch to batch or piece to piece is lower than for tape casting. With screen-printing, one can have better control over the shapes of the applied porous layer, and can also more easily apply customized coatings for individual pre-finished slides."

(see page 14, line 25-page 15, line 13).

The Examiner also indicated that Glazer, Havens, and Kuroita do not teach "tape-casted frit layers" (see page 6 in the current Office Action). Applicants respectfully submit that Glazer, Havens, and Kuroita do not teach or suggest the "tape-casted porous inorganic layer" recited in the amended independent Claim 38. Moreover, Applicants have added dependent Claim 39 which recites where the claimed substrate has a "tape-casted glass interlayer" disposed between the tape-casted porous inorganic layer and the flat, rigid, non-porous, inorganic understructure. Applicants respectfully submit that Glazer, Havens, and Kuroita do not teach or suggest the "tape-casted glass interlayer" (see the discussion above related to the "glass interlayer" in the amended independent Claim 1). In view of at least the foregoing remarks, Applicants respectfully submit that amended independent Claim 38 and its dependent Claim 39 are patentable over Glazer, Havens, and Kuroita.

Conclusion

Applicants respectfully submit that all of the stated grounds of objections and rejections have been properly traversed, accommodated, or rendered moot. Accordingly, Applicants respectfully request reconsideration of all outstanding objections and rejections and allowance of pending Claims 1, 2, 4, 9, 13-14, 16, 20-21 and 38-39.

Applicants have used a credit card to pay \$ 50.00 which is the fee for the new dependent Claim 39. If this is incorrect, the Commissioner is authorized to charge any fees which may be required for this paper to Deposit Account No. 50-1481.

Respectfully submitted,

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